Amendments to the Specification:

Please substitute the following amended paragraph 0002.

[0002] In the general field of computer-based systems, involving multiple and varied work stations located at multiple and diverse sites providing services of differing classification, the procedures for controlling data flow are known to be extremely complex.

Please substitute the following amended paragraphs 0004 and 0005.

[0004] An example of the environment contemplated by the present invention is in an IP router which processes a large number of packets coming from and destined for a large number of user sites. To provide service to end users that is better than "best effort" the system needs to strictly adhere to sets of rules which dictate how data packets are processed. Obviously, taking into consideration the vast volume of traffic in communications systems such as the Internet, it would be difficult to compare each packet with a rule and to determine whether it meets established criteria. Thus, the aforementioned range-specified rules [[based]] algorithm can be applied.

[0005] For the sake of the following description reference is made to methods of implementing algorithms for multi-field packet classification by range specified rules used in IP routers. Classification is a very important function that is a part of applications such as firewall, [[Ipsec]] IPsec and Quality of service. Firewall needs to classify packets based on a pre-defined set of rules so that it can filter/block some flow packets from entering the network. IPsec needs to classify packets based on rules so that specific flow packets can be matched to the

corresponding security policy and associations that indicate the security algorithms, and secure keys can be applied to the flow packets. Quality of service needs to perform classification function on packets, so that Quality of service attributes like delay bounds, packet loss bounds and bandwidth can be associated with the flow packets. In VPN environments, all the three applications of firewall, IPsec, and Quality of service may have to be applied to the edge router device. Hence, efficient implementation of the classification function becomes even more vital in such environments. Improved classification algorithms can guarantee high-performance with reduced resource requirements for implementation. The capacity of the existing application of the packet classification algorithms can be gracefully enlarged in terms of the computational resources. It will be apparent to one skilled in the art, however, that the algorithms can also apply to other calculations where a range-based or specified subset of rules is used.

Please substitute the following amended paragraph 0044.

[0044] The disjoint graph is comprised of two new types of data structures: an elementary interval tree (EIT) and a disjoint interval <u>tree</u> (DIT). The disjoint graph is constructed based on a range-specified rule set for classifying packets. Each rule in the rule set has an equal number of fields, D, and each field specifies a range, referred to as an integer interval, having a lower and an upper bound. The disjoint graph has the same number of layers, D, as there are fields in each rule. The layers are comprised of nodes, and each node has an associated rule set selected from the original (range-specified) rule set.

Please substitute the "Brief Description of the Drawings" (including paragraphs 0051-0064) for the following amended paragraphs:

Brief Description Of The Drawings

[0051] The invention will now be described in greater detail with reference to the attached drawings wherein:

[0052] ~~Figure 1 illustrates~~ <u>Figures 1A-1D illustrate</u> a basic rule set with five rules, each rule having three fields;

[0053] Figure 2 shows a FIS tree built for the rule set of ~~Figure 1~~ <u>Figures 1A-1D</u>;

[0054] ~~Figure 3 illustrates~~ <u>Figures 3A-3C</u> illustrate the construction of DITs and EITs;

[0055] Figure 4 shows a disjoint graph constructed for the rule set of ~~Figure 1~~ <u>Figures 1A-1D</u>;

[0056] Figure 5 shows an interval set S with three intervals;

[0057] Figure 6 illustrates a PR-Tree built for the set of Figure 5;

[0058] Figure 7 illustrates the EIT built for the set of Figure 5;

[0059] Figure 8 illustrates an interval set S with five intervals;

[0060] Figure 9 shows an interval Tree built for the set of Figure 8;

[0061] Figure 10 is a PR-Tree built for the set of Figure 8;

[0062] ~~Figure 11 is~~ Figures 11A-11E illustrate a decision tree built for the set of Figure 8;

[0063] Figure 12a is a DIT for the set of Figure 8; and

[0064] Figure 12b is an EIT for the set of Figure 8.

Please substitute the following amended paragraphs 0069 and 0070:

[0069] For example, ~~Figure 3 is the example~~ Figures 3A-3C are examples of DIT and EIT construction. Figure 3C ~~3.c~~ shows that two EITs have a duplicated sub-EIT, but they can't share the duplicated sub-EITs since the sub-EIT is in the "middle" of both EITs. But when we create a DIT for each EIT, we can use the DITs to replace the original EITs and let the two DITs share a single sub-EIT.

[0070] Figure 4 is the Disjoint Graph *G* constructed for the set of rules *S* with 3 fields given in ~~Figure 1~~ Figures 1A-1D. *G* has 3 layers: 1) layer 1 contains one F_1-*EIT* constructed for the rule set *S*; 2) layer 2 contains six F_2-*DITs* for associated rule sets of nodes in the F_1-*EIT* and two F_2-*EITs* constructed for associated rule sets (*ARSs*) of nodes in the six F_2-*DITs*, because there are six different *ARSs* whose sizes are greater than 1 in the F_1-*EIT* and two different *ARSs* whose sizes are greater than 1 in the six F_2-*DITs*; 3) layer 3 contains two F_3-*DITs* constructed for *ARSs* of nodes in the two F_2-*EITs* and one F_3-*EIT* constructed for *ARS*s of nodes in the two F_3-*DITs*, because there are two different *ARSs* whose sizes are greater than 1 in the two F_2-*EIT* and two different *ARSs* whose sizes are greater than 1 in the two F_3-*DITs*.

Please substitute the following amended paragraph 0098:

[0098] An example of the decision tree built for the set of intervals in Figure 8 is given in ~~Figure 11~~ Figures 11A-11E.